In response to the rejections of claim 5 and 20 under 35 U.S.C. 112, second paragraph, the applicant has amended the claims as follows. Claim 5 has been amended to read "it is determined", which in the submission of Applicant removes any previous indefiniteness. Claim 20 has been amended to change its dependency on claim 18, thereby providing proper antecedent basis for the claimed "said receive amplifier".

The Examiner has rejected claims 1, 6-20 under 35 U.S.C. 103(a) as allegedly being unpatentable over the Berger et al. reference (United States Patent No. 6,088,152). The Examiner states that Berger discloses a method for determining a Raman gain of an optically amplified fiber optic span 130, making reference to Figure 2 of Berger. Applicant respectfully submits that there are many substantial differences between Berger and the present invention.

Berger provides a somewhat limited, and consequently inaccurate, definition of Raman gain. Berger, at column 1, lines 11-14, defines Raman gain as "the difference between the power (in dB) of the longest wavelength channel and the power (in dB) of the shortest wavelength channel." However, this difference calculation in Berger only defines the Raman-induced tilt, or simulated Raman scattering (SRS). In determining a Raman tilt, which is produced as a result of the Raman gain, Berger is simply measuring a *result* of the Raman gain, and not the Raman gain itself. In fact, to calculate the Raman gain based on the Raman tilt measurements performed in Berger would be fairly complicated. The Raman gain does not consist simply of a value defined by the difference between two power values; rather, it comprises a spectral profile that characterizes the gain introduced by the Raman effect, which is produced by the application of Raman pumps to a system.

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Berger, in fact, attempts to accomplish something totally different than embodiments of the present invention. Berger measures a Raman-induced tilt introduced by a Raman pump, in order to attempt to compensate for this tilt by preconditioning, or pre-tilting, optical signals prior to transmitting signals over a fiber optic span (column 1, lines 49-52). This compensation is achieved via the use of an erbium-doped fiber. Therefore, in Berger, the measurement of Raman-induced tilt is an initial measurement used to begin the calculations for determining the desired pre-tilting. This is categorically different from the measurements performed according to embodiments of the present invention.

The measurements of input power and output power as described in Berger are also significantly different from those according to embodiments of the present invention. In Berger, the output power is defined as the level of power, designated P_o, of the signal that is outputted to path 130 (column 4, lines 55-57), after the signal has travelled through the compensating means, i.e. erbium-doped fiber 45. In embodiments of the present invention, output power is measured at the output of the particular optical fiber span being considered (see, for example, Figure 1 of the instant application).

The measurement of output power in the instant application would correspond, roughly speaking, to a measurement taken at point "a" in Figure 4 of Berger. The closest thing in Berger to such a measurement is found at column 5, lines 30-36. In Berger, the value of the power that is launched into the output fiber is used to indirectly index a table of Pretilt values, and read out a pretilt value appropriate for the launched power value. As such, an "output power" similar to that in the instant application is not measured in Berger, but is rather calculated or approximated by consulting a table of probable values based on the output from the compensating means.

As a consequence of these significant differences in power measurements, any apparent similarities between power difference calculations in Berger and power profile difference calculations in the instant application may easily be dismissed by the fact that the output powers being measured in the two instances are entirely different parameters.

The fact also remains that Berger does not measure Raman gain. Fundamentally, any attempt to calculate the gain introduced by the application of stimulation that produces a Raman effect should consider the power profile prior to the application of the stimulation. The calculations disclosed in Berger are all performed subsequent to the application of stimulation, such as that produced by Raman pumps. Raman gain calculation is never discussed in Berger because power measurement prior to the application of Raman stimulation is not considered therein. Without any knowledge of such prior power measurement, one would be hard pressed to characterize any gain that may have been introduced with respect to the prior power measurement. Such measurement of changed power profiles is performed according to embodiments of the present invention. Amended claims 1 and 12 represent the cases in which power profile measurements before and after the application of one or more Raman pumps are compared in order to determine the Raman gain.

It is respectfully submitted that in light of the deficiencies of the teachings of Berger outlined above, amended claims 1 and 12, as well as the other claims on file, are patentable over Berger. Because of the dependency of all other claims in the instant application on independent claims 1 and 12, Applicant respectfully submits that each of the amended claims on file comprise features which patentably distinguish the instant application over the prior art.

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The Examiner has also rejected claims 2-5 under 35 U.S.C. 103(a) as allegedly being unpatentable over the Berger et al. reference, in view of the Stentz et al. reference (United States Patent No. 6,163,636). In view of the arguments provided regarding the patentability of the claims on file with respect to Berger, it is respectfully submitted that the combination of Berger and Stentz does not render the claims on file obvious. Furthermore, there is no indication in either Berger or Stentz to combine the teachings of the two references in a manner similar to that claimed in the instant application. However, the fact remains that Berger never discloses or suggests the calculation of Raman gain. As such, because of the deficiencies in the teachings of Berger, even if a combination of the two references were suggested or indicated, the combination of the teachings of Berger and Stentz would not render obvious the invention as claimed.

Therefore, it is respectfully submitted that in light of the deficiencies of the teachings of Berger and Stentz outlined above, the amended claims on file, are patentable over Berger in view of Stentz. Applicant respectfully submits that each of the amended claims on file comprise features which patentably distinguish the instant application over the prior art.

Applicant respectfully submits that the amended claims on file overcome all of the rejections outlined in the outstanding Office Action. The amendments to claims 5 and 20 have already been discussed. Previous claim 2 has been deleted and its contents have been incorporated into amended claim 1. A similar incorporation was made into amended claim 12. The amendments to claims 1 and 12 are fully supported by the description, claims and drawings as originally filed, and no new matter is being introduced thereby. Claims 21 and 23 have been added so as to separately claim the aspect of dynamically calculating, or continually recalculating,

the Raman gain; this feature was present in previous claims 1 and 12. Claim 22 is substantially identical to claim 8, except for the fact that it is dependent on claim 21 rather than on claim 1. Minor amendments have been made to claims 4 and 6-11 so as to ensure consistency with and proper antecedent references based on the wording of the other amended claims.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made".

It is believed that the application is now in condition for allowance and early action in that respect is courteously solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Please amend the specification as follows:

CROSS-REFERENCE TO RELATED APPLICATION

This application is related to the co-pending and commonly-assigned application Ser. No. [_____] 09/824,799, filed on same date herewith, by Paul Reepschlager, entitled "Methods and System for Automatic Optical Fiber Type Identification."

Please amend claims 1, 3-12, 16 and 20 as follows:

1. (Amended) A method of [dynamically] determining a Raman gain profile of an optically amplified fiber optic span, said method comprising the steps of:

obtaining a first measured [measuring a] power profile for each of a plurality of system components;

applying one or more Raman pumps to said fiber optic span for providing additional optical amplification thereto;

[transmitting the measured power profiles to a central location;

[transmitting changes in the measured power profiles to the central location; and]

obtaining a second measured power profile for each of said plurality of system components; and

[dynamically] calculating the Raman gain profile for the system based on the [changes] difference in the measured power profiles.

3. (Amended) A method according to claim [2] 1 wherein power settings for the Raman pump are calculated relative to a loss profile of a fiber optic span measured under non traffic-carrying conditions in order to achieve a specified Raman gain profile.

4. (Amended) A method according to claim [2] 1 wherein said steps of obtaining said measured [measuring a] power profiles for each of [a] said plurality of system components include[s] measuring: an originating profile at an output of a transmit amplifier, a loss profile of a fiber optic span, and an incident profile at an input of a receive amplifier.

5. (Amended) A method according to claim 4 wherein if the incident profile changes, and it is known that the originating profile remains unchanged and the output power monitor conditions remain unchanged on the Raman pumps, it [may be] is determined that changes in the measured power profiles have occurred
along the fiber optic span.

6. (Amended) A method according to claim [1] 21 wherein the step of transmitting any change[s] in said power profile comprises conveying basic information over an overhead channel.

7. (Amended) A method according to claim [1] 21 wherein the step of transmitting any change[s] in said power profile is performed when the magnitude of the change is outside limits defined by a tolerance band.

8. (Amended) A method according to claim 1 wherein said step of obtaining said measured [measuring a] power profile for each of [a] said plurality of system components includes measuring: an originating profile at an output of a transmit amplifier, a loss profile of a fiber optic span, and an incident profile at an input of a receive amplifier.

9. (Amended) A method according to claim [8] 22 wherein the step of transmitting any change[s] in said power profile comprises conveying a status update on a regular basis from the transmit amplifier.

10. (Amended) A method according to claim [8] 22 wherein said step of [dynamically] recalculating the Raman gain profile comprises summing updated values of the incident profile and the loss profile, and subtracting therefrom the originating profile.

11. (Amended) A method according to claim [8] 22 wherein said step of [dynamically] recalculating the Raman gain profile is performed at said receive amplifier.

12. (Amended) A system for [dynamically] determining a Raman gain profile of an optically amplified fiber optic span, said system comprising:

a plurality of optical spectrum analyzers for measuring first and second power profiles of said fiber optic span and of a plurality of system components, said first power profiles being measured before application of one or more Raman pumps to said fiber optic span, and said second power profiles being measured after application of said one or more Raman pumps, so as to determine the existence of a loss or a gain therein;

means for receiving the measured power profiles from the optical spectrum analyzers[, and for receiving changes in the measured power profiles]; and

means for [dynamically] calculating the Raman gain profile for the system based on the [changes] difference in the measured power profiles.

16. (Amended) A system according to claim 12 wherein the means for [dynamically] calculating comprises a processor.

20. (Amended) A system according to claim [17] 18 wherein said means for receiving, said means for dynamically calculating, and said receive amplifier are all integral with one another.

Please add claims 21 to 23 as follows:

21. (Newly added) A method according to claim 1 further comprising the steps of:

continually monitoring power profiles of each of said plurality of system components after application of said one or more Raman pumps;

transmitting any change in said power profiles to a central location; and

recalculating, in real-time, the Raman gain profile following such change.

22. (Newly added) A method according to claim 21 wherein said step of measuring a power profile for each of a plurality of system components includes measuring: an originating profile at an output of a transmit amplifier, a loss profile of a fiber optic span, and an incident profile at an input of a receive amplifier.

23. (Newly added) A system according to claim 12 further comprising:

means for continually monitoring power profiles of each of said plurality of system components after application of said one or more Raman pumps;

means for transmitting any change in said power profiles to a central location; and

means for recalculating, in real-time, the Raman gain profile following such change.